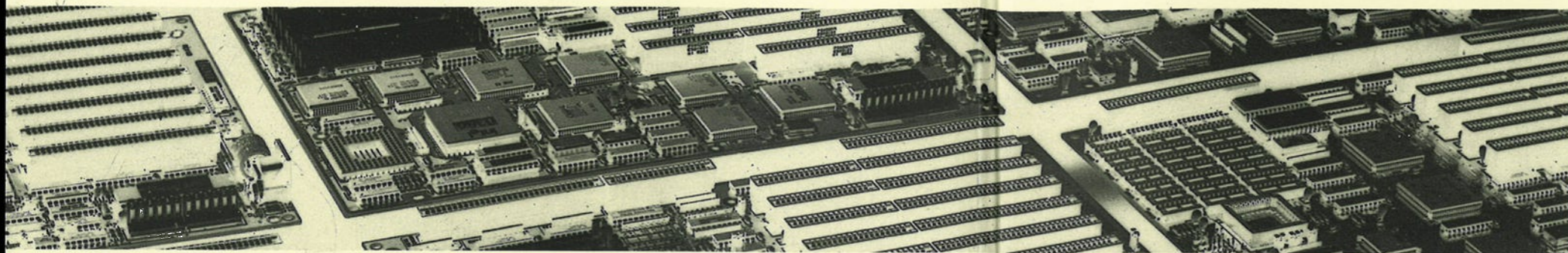


SL 486E



USER'S MANUAL

Version 1.1

SL 486E
Mainboard
User's Manual

SL 486E -810625

INTRODUCTION

This manual has been designed for several purposes. If the SL 486E is already set up in a functioning system, it will be helpful to review the manual to become familiar with the features of the board and where things are. This will be helpful in the unlikely event there is a problem with the system.

For those who want to alter the board's configuration or upgrade it, the manual will serve as a guide to both procedures and specifications. While the necessary information is included in the manual, we recommend that unless you feel confident of your ability to do the work, it would be best to have your dealer or a local service shop do it. Before making alterations to the system, check to see that doing so will not violate the system warranty. If it does, have the work done by an authorized dealer.

The "chip set" consists of six chips; SiS85C411/420/431/405/406, which incorporate most of the logic required for a low-cost, highly integrated IBM PC AT-compatible computer.

IMPORTANT: The chip set requires correct configuration information; otherwise a malfunction may result.

CAUTION: Static electricity can cause serious damage to integrated circuit chips. To avoid building up a static electric charge on your body, touch a grounded object before touching the chips and at frequent intervals as you handle the chips. If chips are handed from one person to another, the two should touch hands first, then pass the chips.

Information presented in this publication has been carefully checked for reliability; however, no responsibility is assumed for inaccuracies. The information contained in this document is subject to change without notice.

Contact your dealer for warranty details.

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Chapter 1

Introduction

This chapter will cover the general specifications and features of the SL 486E.

1.1 General Specifications and Features

The MX 386 is a cost-effective high performance mainboard

- Processor:
 - Support primary CPU with 80486SX/DX for 20/25/33/50 MHz, or 80486DX2 for 25/33/50/66 MHz.
 - Support CPU upgrade socket with 80487SX/P23T.
- Memory
 - Cache:
 - Write-back/ write-through selectable direct mapped cache controller.
 - Support 64KB/128KB/256KB Cache memory size.
 - Flexible burst Read Timing option, 2-1-1-1, 3-1-1-1, 2-2-2-2, and 3-2-2-2.
 - Two programmable Non-Cacheable regions.
 - Memory:
 - Support 486 burst and EISA burst modes to local memory access.
 - Bank Interleaved Fast Page Mode DRAM access.
 - Support 256K/ 1M/ 4M/ 16M 30-pin SIMM module for up to 128 MB main memory.
 - Transparent DRAM refresh.
- Support AMI 64 KB BIOS.
- Support 8 EISA 32-bit slots with 6 master slots (S1-S6), 1 slave slot (S8) and 1 slave slot (S7) with MCA connector (S9). This S7 slot is combined with MCA connector S9 to support ECS' VI 911, VI 811/833 local bus VGA cards. Moreover, the S7 slot can be used as a slave EISA slot also.
- Provide EISA/ ISA bus compatibility.
- Based on SiS85C411/420/431/405/406 EISA chipset.

1.2 Major Components

The SL 486E mainboard is composed of many integrated circuits, chips, jumpers and connectors. (Please refer to Figure 3.1)

The major components and their basic features and functions are outlined as below:

■ 80486 CPU (Central Processing Unit)

The central processing unit is the brain of a computer system that interprets and executes instructions, such as performing calculations, routing information, and temporarily storing data. In personal computers, the CPU is a highly integrated chip called the microprocessor.

■ SiS/EISA 486 Chipset

The SiS85C405, 85C406, 85C411, 85C420, and 85C431 chipset supports 486-based EISA system. Such chipset is achieved through a very high level of function integration, system partition and is proven to be a high performance, compact and cost-effective product. This EISA chipset consists of the following:

- SiS85C405 (Address Buffer)
The Address Buffer is a buffer interfacing between EISA LA and SA address bus. It also contains EISA bus refresh counter to generate address during refresh cycle.
- SiS85C406 (Highly Integrated System Peripheral)
The Highly Integrated System Peripheral integrates all the necessary peripheral control logic used in EISA specific applications. The SiS85C406 consists of : an arbitration scheme that allows efficient bus sharing among multiple EISA masters, the host CPU, Refresh, and DMA devices; a seven-channel programmable DMA Controller, a 16 level programmable interrupt controller which provides level or edge triggered interrupt capability on a channel-by-channel basis; non-maskable interrupt logic for multiple NMI control and generation; five counters/timers which provide a system timer interrupt, DRAM refresh requests, a fail safe timer, a speaker tone output, and a periodic CPU speed control. Besides, SiS85C406 also integrates the imperative glue logic in EISA system to further minimize the number of board components.

- SiS85C411 (System/Cache/DRAM Controller)
The System/Cache/DRAM Controller provides powerful cache, DRAM and CPU interfaces utilizing the integration of faster and configurable memory functions and most efficient cache systems. Its memory logic circuit can respond to the CPU and EISA burst cycle allowing faster transfer operations. With its bank (or double-word) memory interleaving, systems at full speed can attain the utmost memory speed.
- SiS85C420 (EISA Bus Controller)
The EISA Bus Controller is a generic EISA Bus Controller which contains all the necessary logic to control EISA bus cycles in the system level design. The SiS85C420 provides the state machines that interfaces to the host, EISA, and ISA buses, and is loosely coupled with SiS85C411 to support 8-, 16-, and 32-bit masters and slaves. SiS85C420, combining with SiS85C406, creates a full feature of EISA system board.
- SiS85C431 (EISA Data Buffer)
The EISA Data Buffer is a general data path chip that provides all the data routing and swapping between the host data bus, memory data bus, and EISA data bus. It also contains parity generation and detection logic.

■ Real-Time Clock

The Real-Time Clock contains a self-contained lithium battery which offers ten years of data retention capability.

■ Non-Volatile SRAM

The NVM employs 4K x 4 of SRAM and a self-contained lithium battery which offers ten years of data retention. The NVM can keep the EISA system and add-on card configuration information.

■ BIOS

In addition to reducing space and cost, it allows the user to enable the BIOS shadow feature for access to the fast chip (DRAM) instead of the slow one (EPROM).

■ Jumpers

On the SL 486E there are several jumpers which should be properly set according to the system configuration.

Detailed information regarding all jumpers can be obtained from Chapter 3.

■ Connectors

Several connectors are used to connect the power supply, keyboard and LED indicators. Refer to Chapter 3 for more details.

■ Slots

Support 8 EISA 32-bit slots with 6 master slots (S1-S6), 1 slave slot (S8) and 1 slave slot (S7) with MCA connector (S9).

Chapter 2

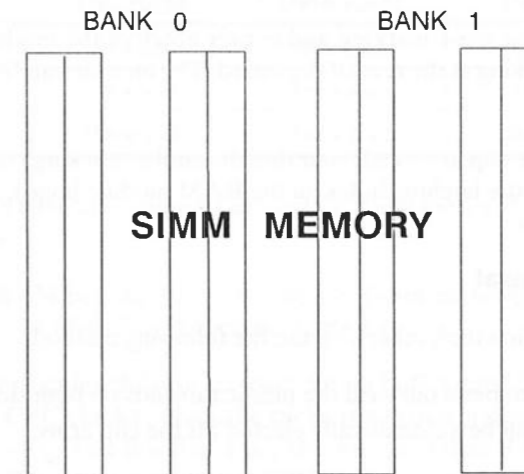
Memory Configuration

In this chapter, the SL 486E DRAM configurations are discussed, followed by instructions for DRAM module installation and removal. Users are recommended to read through this chapter before installing or removing memory.

2.1 System Memory

The SL 486E provides tremendous flexibility to support a number of different on-board DRAM configurations. The on-board DRAM is installed with SIMM (Single-In-Line Memory Module). There are two banks of DRAM module slots seated on the SL 486E to support up to 128 MB of on-board memory.

The location and layout of all the SIMM banks is illustrated below and shown in Figure 3.1:



Each bank is composed of four standard 30-pin SIMM sockets. These sockets take 256KB, 1MB, 4MB, 16MB SIMM.

Note that all of the four SIMMs within a bank must be of the same type; you can not mix 256KB, 1MB, 4MB, or 16MB modules in the same bank.

The SL 486E board provides 8 sockets for SIMM modules. These 8 sockets are divided into two banks and each bank can accommodate four SIMM sockets. Every bank can accept 256KB, 1MB, 4MB or 16MB SIMM modules, but all of the four SIMM modules used in the same bank must be the same size. This ability for mixing assorted SIMM modules on the two banks allows the system to be shipped with minimal memory and upgrade without sacrificing the memory already on board.

Since this main board is designed to automatically scan the total memory installed, there is no jumper for further adjustment when installing or reinstalling the SIMM modules. Please note that there is a bank ordering restriction for SIMM installation. In other words, the user must install SIMM modules from left side (bank 0).

2.1.1 DRAM Module Insertion

The SIMMs must be seated on the sockets as firmly as possible, and, because of the fragility of the slot, you must be careful when inserting or removing the module.

1. Align the module so that the pin-1 marking and corner notch of the module correspond to the SIMM socket pin 1 marking at the rear of the board. The module can fit in the socket one way only. Do not force it!
2. Push the module against the clip arms with your thumbs until a "clicking" sound is heard; the little plastic tabs appear in the latching holes on the RAM module board, and the clip arms fully grab the module board.

2.1.2 DRAM Module Removal

If possible, use a SIMM extraction tool; otherwise use the following method:

1. Carefully use your thumbs to bend outward the plastic tab ends on both sides of the slot.
2. The RAM module board will be automatically ejected off the clip arms.
3. Take it out of the socket.
4. Repeat step 1 through 3 to release the other RAM modules.

2.2 Cache Memory Subsystem

For CPU cycles, the content of the cache memory is renewed when either the cache read miss or write hit occurs. Tag and data RAMs are both updated in the cache read miss cycles. In the cache write hit cycles, the SiS85C411 updates only the data RAM. In the cache write miss cycles, the 80486 writes data into the main memory (DRAM), while the cache memory remains unchanged. The alter bits in the write-back cache are reset in the cache update (read miss) cycles and set in the hit cycles.

When the cache is disabled, all the CPU reads to the cacheable memory are treated as cache read miss, so both tag and data RAMs are updated. This feature is used to initialize the cache memory before enabling it.

In DMA/master cycles, the cache data RAM is written when a written when hit occurs, to assure the cache coherency. Cache memory is not accessed in DMA/master write miss or read cycles for write-through cache. For the write-back cache, DMA/master read hit cycles are conducted to the cache, not to the DRAM. The following is the Cache size options.

Cache Size	Tag RAM	Data RAM	Dirty Bit	Cacheable Size
64 KB	16K x 4 x 2	8K x 8 x 8	16K x 4 x 1	16 MB
128 KB	16K x 4 x 2	32K x 8 x 4	16K x 4 x 1	32 MB
256 KB	16K x 4 x 2	32K x 8 x 8	16K x 4 x 1	64 MB

Note: The 128 KB Cache memory are installed by 4 pieces of 32K x 8 bit SRAM on U18, U11, U7, U4.

The on-board DRAM beyond the cacheable size is not cacheable for the secondary cache. It is still cacheable for the 80486 internal cache, however.

To reduce the propagation delay of the chip output buffer, the SiS85C411 employs an "advanced clock" instead of CPU clock to clock the cache read control signals. The advanced clock should lead CPU clock by 3 to 7 ns. It will increase the margin of data RAM access time. For 16/20 MHz systems, the ACLK can be connected to CPUCLK to simplify the clock circuit.

The following is a table of cache configurations and suggested speed ratings of the SRAM for implementing the cache data RAM for various speeds of the 80486 CPU.

Cache Configuration	25 MHz CPU	33 MHz CPU	50 MHz CPU
2-1-2 Interleave *	35 ns	20 ns	None
2-1-2 Non-interleave	25 ns	--	None
2-2-2 Non-interleave	--	20 ns	None
3-2-3 Non-interleave	--	--	25 ns
3-2-3 Interleave	--	--	30 ns

Note: "*" x-y-z means x-y-y burst read and zT write cycle.
 Interleave means two banks Cache (64KB/256KB)
 Non-interleave means one bank Cache (128 KB).

Chapter 3

Jumper Settings and Connectors

This chapter will assist you in setting up the SL 486E before you install it in a system case. If your SL 486E has already been installed and you do not wish to change the configuration settings, you can skip over this section.

3.1 Jumper Settings

The SL 486E has several jumper switches that must be set to define a system configuration. These switches are three-pin components on the mainboard. They are turned off and on by placing or removing a cover cap over the pins. This is called a short or closed jumper. All jumpers must be set to one of the possible two settings.

Figure 3.1 shows the location of the jumpers and connectors.

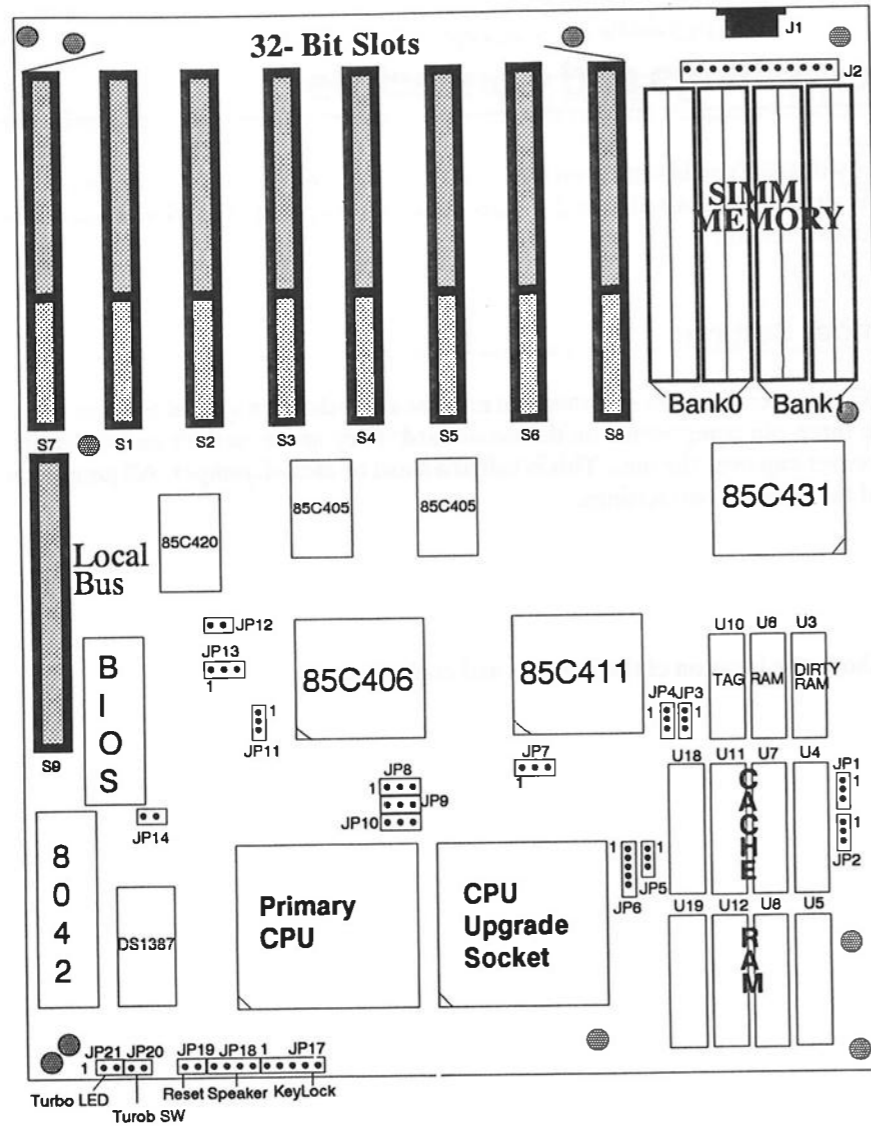


Figure 3.1 SL 486E Board Layout

The table below summarizes the function and settings of each jumper on the SL 486E.

Function		Jumper Settings
Type of display adapter	Monochrome	JP14 opened
	Color	JP14 closed
CPU Type Selection	486DX	JP8 pin 2,3 closed JP9 pin 2,3 closed JP10 pin 1,2 closed
	486SX	JP8 pin 1,2 closed JP9 pin 1,2 closed JP10 pin 1,2 closed
	487SX	JP8 pin 2,3 closed JP9 pin 2,3 closed JP10 pin 1,2 closed
CPU Speed Selection	Under 50 MHz	JP7 pin 1,2 closed
	50 MHz	JP7 pin 2,3 closed
Turbo Switch	Turbo Mode	JP20 pin 1,2 opened
	DE-Turbo Mode	JP20 pin 1,2 closed
CPU MISS Selection	For BUS CYCLE is pending and that SYSTEM ARBITRATION LOGIC in the 85C406 should include the CPU	JP11 pin 2,3 closed
	For SYSTEM ARBITRATION LOGIC in the 85C406 by pass CPU	JP11 pin 1,2 closed
SRAM Bank Selection	For One bank with SRAM	JP6 pin 1,2 closed
	For Two banks with 8K x 8 SRAM	JP6 pin 2,3 closed
	For Two banks with 32K x 8 SRAM	JP6 pin 4,5 closed
SRAM Type Selection	For 8K x 8 SRAM	JP5 pin 1,2 closed
	For 32K x 8 SRAM	JP5 pin 2,3 closed
Refresh Signal Selection	Default	JP13 pin 1,2 closed

Function		Jumper Settings
ALT Bit Selection	64K	JP1 pin 1,2 closed JP2 pin 1,2 closed
	128K	JP1 pin 1,2 closed JP2 pin 2,3 closed
	256K	JP1 pin 2,3 closed JP2 pin 2,3 closed
Cache RAM Size Selection	64K	JP3 pin 1,2 closed JP4 pin 1,2 closed
	128K	JP3 pin 2,3 closed JP4 pin 1,2 closed
	256K	JP3 pin 2,3 closed JP4 pin 2,3 closed
Local Memory Burst Mode Selection	For Memory Slaves are capable of accepting burst cycles.	JP12 closed
	For Non-Burst mode	JP12 opened

3.2 Connectors

There are several connectors located on the SL 486E. They are used to connect with some peripheral devices to enhance the operating performance of the system.

Refer to Figure 3.1 for the positions of all the connectors on the mainboard. Their functions are listed below:

Connector	Function
J1	Keyboard Connector
J2	Power Supply
JP17	KeyLock Connector
JP18	Speaker Connector
JP19	Hardware Reset Connector
JP20	Turbo Switch Connector
JP21	Turbo LED Indicator

Chapter 4

System Installation

If the SL 486E is not yet installed in a computer system, then the following basic information will be of use. Because of the wide variety of cases, it is not possible to provide exact instructions for every case. This section covers the factors common to installing the board in most situations. A board illustration is shown in Figure 3.1.

Before removing the board from its anti-static bag read the caution notice in the Introduction.

4.1 Mounting Holes, Fasteners

The SL 486E has 13 mounting holes drilled in its printed circuit boards. These will line up with some or all of the mounting points on the case. In some cases, the long inside edge of the board fits under metal flanges in the case frame rather than being screwed to the case.

Cases can come with a variety of mounting fasteners, both metal and plastic. In general, metal fasteners are attached to the case and the board is attached to the case by metal screws and/or plastic snaps. The plastic fasteners usually snap into the board and then lock into slotted holes in the case bracket. Metal fasteners can ground the board to the case.

4.2 Peripheral Connections

IMPORTANT: Turn off power before changing any connections!

These connectors look the same as jumpers and have varying numbers of pins. Whichever indicators or devices are present on the case will have wire leads extending from them with plastic female connectors attached. The connectors should be plugged onto the appropriate connecting pins on the board.

Keyboard (J1)

The SL 486E has a standard 5-pin DIN keyboard jack at the rear of the board, for an AT type keyboard.

Power Supply (J2)

The SL 486E requires a power supply of at least 200 watts in order to be used in a fully configured system that includes a hard disk drive and more than a minimum of expansion cards installed. Power supplies commonly supplied for AT-type system boards generally have a power good signal.

The power supply connectors on the SL 486E use a standard 12-pin header, PS, located near the right rear of each board. Dual connectors from the power supply plug directly onto these. Each has multiple wires extending from it. The black wires on each connector should be placed so that they are to the inside, near each other.

4.3 Case Connections

The SL 486E has connectors for utilities that are commonly mounted on the front panel of most system cases. These include

- Keyboard Lock
- Speaker
- Reset Button
- Turbo Switch
- Turbo LED Indicator

Keyboard Lock (JP17)

The SL 486E has a connector (JP17) for a keyboard lock. If this has been connected to the front panel of the case, a key provided with the case can be used to disable the keyboard electrically. This does not actually lock the keyboard. The keyboard cannot be turned back on from this switch without the correct key. This device provides security from casual tampering with the system. It will not stop a determined intruder if the case can be opened and the function disconnected inside.

Speaker (JP18)

Connector the speaker to JP18.

Reset Button (JP19)

The SL 486E has a connector for a reset button (JP19). If this has been connected to the front panel of the system case, the button can be used to restart the system without turning the power off. Pushing the button will cause the system to restart from the memory test. It is then necessary to reboot the operating system software before continuing.

Turbo Switch Connector (JP20)

Set the turbo switch to "Turbo" or "De-turbo". See the selections in chapter 3 for Jumper Settings and Connectors.

Turbo LED Connector (JP21)

If the front panel has an LED to indicate the turbo mode, connect it to JP21.

Chapter 5

Built-in BIOS Setup Program

This chapter provides detailed instructions on how to configure your system using the Built-in BIOS Setup Program and gives some technical information about your computer. If you are not very familiar with microcomputers, please read this chapter carefully before proceeding. If you do not want to change the system's configuration, you can skip this chapter.

Before you start to add optional devices to your system, you should first learn how to set up your system and adjust its jumpers (Refer to Chapter 3 for detailed information). You may run the Setup Program of the SL 486E only after all jumper setting adjustments have been completed. At this time you should record what the configuration is, and keep it for reference.

5.1 Setup Summary

1. Install any extra memory SIMMs.
2. Set jumper JP14 for color or monochrome monitor.
3. Make all connections to board.
4. Install control cards, monitor, and any peripheral devices and drivers.
5. Turn-on system.
6. At setup prompt, press the **Del** key.
7. Type the password if you set the password checking option to "Setup" or "Always" in the Advanced CMOS Setup program.
8. Choose Standard CMOS, Advanced CMOS or Advanced CHIPSet Setup.
9. Follow screen prompts.

5.2 BIOS Setup

Every AT-compatible computer has battery supported CMOS memory otherwise called "non-volatile" RAM. It stores information about your computer and peripheral device configuration. Unlike ordinary RAM, it retains the information even after you turn off your computer.

A computer needs to know certain things about itself so it can operate correctly when powered on. A special type of software called BIOS (Basic Input Output System) is contained in read-only memory (ROM) chips on the mainboard. The BIOS reads information from the CMOS memory every time you power on the computer. It then instructs the CPU and other devices to operate according to this information. If the information it retrieves is incorrect or insufficient, the system may not be able to operate properly until accurate information is supplied. You do this by means of the SETUP program built in the system BIOS.

5.2.1 When Should You Run Setup ?

1. Although someone may have set up the system for you, you may want to adjust the system to fit your needs.
2. Whenever you change some components in your system, (for example, if you add a hard disk or more memory), you must run Setup to record the new system configuration. If you don't do so after adding memory, the computer will prompt you to run Setup.
3. The last and most unlikely possibility is the loss of information in the CMOS memory. You may never encounter this situation, but if you do, you can restore the information by running Setup.

5.2.2 How to Recall the Setup Program ?

You can run the built-in SETUP program in several ways:

1. When powering-on the system

When you turn on the system power or press the reset button on the system case while the system is running (not every system has this button), the BIOS will first test the functionality of the system components and display a start-up message similar to the following:

```
XXXX KB OK
Hit <Del>,if you want to run Setup
```

The numeral digits will continue to count at the top left of the screen. This represents the BIOS testing the mainboard memory chips. Before the above message disappears, you can press the key to run the Setup program.

2. To reset the system

By pressing <Ctrl> <Alt> key combination when the system is up and running (assuming you are running under DOS or other environments that support this feature), the system will immediately reset itself and boot up. Before booting up from a diskette or hard disk, you can also see the below start-up message :

```
Hit <Del>,if you want to run Setup
```

3. When the BIOS prompts you

In the self-test process, if the BIOS detects inconsistent or incorrect configuration information or some physical system error, it will display an error message on the screen, and prompt you to take action; for example:

```
Run SETUP UTILITY
Press <F1> to RESUME
```

Press the <F1> key, and continue.

4. To Enter password

If you set the password checking option to the "Setup" or "Always" field in the Advanced CMOS Setup program, after pressing the "Del" key to run the Setup program, the Enter password will be displayed message on the screen. Refer to section 5.6, Using the Change Password Setup.

5.2.3 Running the SETUP Program

When you call up the Setup program, the screen displays a "main menu" similar to the following:

```

      BIOS SETUP PROGRAM - AMIBIOS SETUP UTILITIES
      (C) 1991 American Megatrends Inc., All Rights Reserved

      STANDARD CMOS SETUP
      ADVANCED CMOS SETUP
      ADVANCED CHIPSET SETUP
      AUTO CONFIGURATION WITH BIOS DEFAULTS
      CHANGE PASSWORD
      WRITE TO CMOS AND EXIT
      DO NOT WRITE TO CMOS AND EXIT

StandardCMOSSetupforChangingTime,Date,HardDiskType,etc.
ESC:EXIT ↓→↑←:Sel F2/F3:Color F10:Save&Exit

```

Figure 5.1 BIOS Setup Main Menu Options

On-screen instructions at the bottom of the screen explain how to use the program.

The following is a brief description of the six options of the Setup main menu:

■ STANDARD CMOS SETUP

Display the standard CMOS Setup screen to check or modify general configuration information. The standard CMOS setup displays the date, time, floppy type, hard disk type, video type, etc.

■ ADVANCED CMOS SETUP

The ADVANCED CMOS SETUP option is used to set the various system options for the user, including the above 1 MB memory test, Scratch RAM area for BIOS and Video ROM Shadow.

■ ADVANCED CHIPSET SETUP

This Setup option is for the user who wishes to program the chip set registers. The chip set registers control most of the system options in the computer.

■ AUTO CONFIGURATION WITH BIOS DEFAULTS

This option allows for automatic configuration of all the options in the Advanced CMOS Setup/Advanced Chipset Setup with the BIOS defaults.

■ CHANGE PASSWORD

The password is required for entering the Setup program or booting your system. The user can change the current password stored in the CMOS by accessing this option.

■ WRITE TO CMOS AND EXIT

Choose this option to save the changes you have made in the "Standard Setup", "Advanced Setup" and "Advanced Chipset" option, and then exit to reboot the system.

■ DO NOT WRITE TO CMOS AND EXIT

Choose this option to abandon all previous settings and then exit to reboot the system.

To choose an item from the setup main menu, move the cursor to appropriate line using the Up < ↑ > and Down < ↓ > arrow keys and press < Enter >. The screen will display a warning message as below:

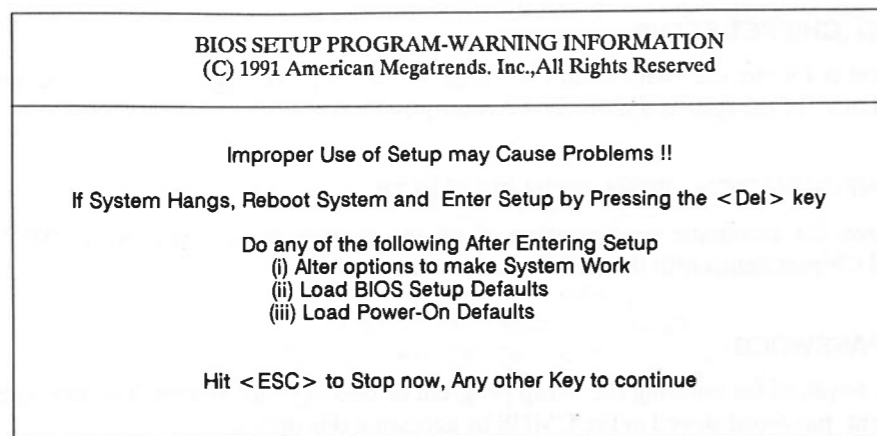


Figure 5.2 BIOS Setup Warning Message

5.3 Running the Standard CMOS Setup

To check or modify the general system configuration, choose "STANDARD CMOS SETUP" from the Setup main menu and press < Enter >. The screen will display the following:

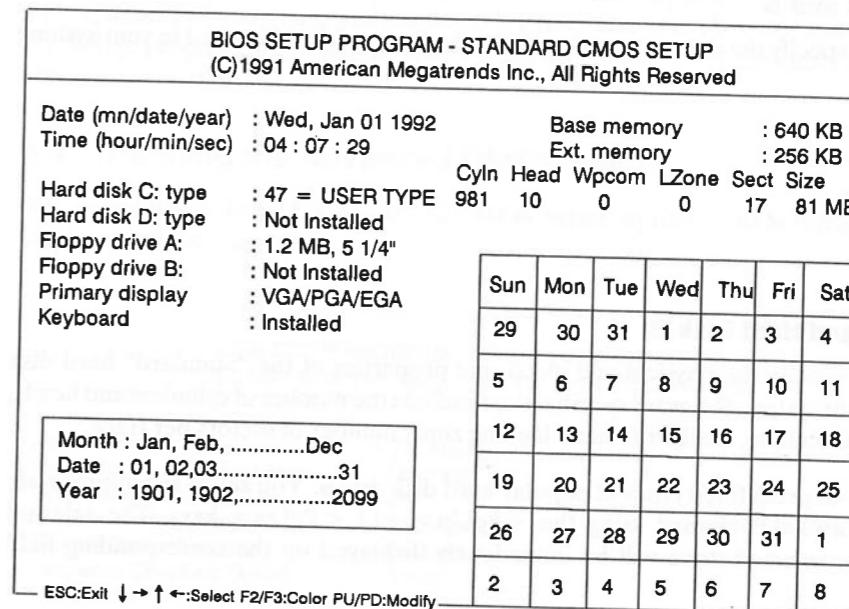


Figure 5.3 The Standard CMOS Setup Program Screen

On-screen instructions in the lower left corner of the screen explain how to use the program. After making all selections, press < ESC > key and then return to the main menu program to choose another Setup program.

■ Date

In the Date fields, you manually set the electronic calendar on the mainboard only if the values are incorrect.

■ Time

Time fields include hour, minutes, seconds, but you can only set the value of hour and minute. Check and adjust these fields according to your clock or wrist watch.

■ Floppy Drive A and B

In this field you may specify the capacity and format of the floppy drives installed in your system:

- 360KB, 5 1/4"
- 1.2 MB, 5 1/4"
- 720KB, 3 1/2"
- 1.44MB, 3 1/2"
- Not Installed

■ Hard Disk C: and Hard Disk D:

In these fields, you specify the physical and electronic properties of the "Standard" hard disk drives installed in your system. Relevant specifications include the number of cylinders and heads, write pre-compensation time, read/write head landing zone, number of sectors per track.

The BIOS provides 46 predefined types of popular hard disk drives. You select the appropriate type by scrolling forward/backward using the <PgUp> and <PgDn> keys. The relevant specifications of the selected drive will be immediately displayed on the corresponding field positions.

If for some reason your particular drive is not one of the 46 predefined types, simply scroll down to select type 47, then use the left <←> and right <→> arrow keys to move to the CylIn(Cylinders), Head, WPcom(Write Pre-Compensation), LZone(Landing Zone), and Sec(Sectors) fields and directly key in the appropriate values. The Setup program will calculate the capacity of the drive based on the input cylinder, head and sector numbers and display the result on the capacity field for your reference.

Refer to Appendix A for the table of hard disk types.

■ Primary Display

In the display field, you specify the display adapter installed in your system.

■ Keyboard

This setting is used to select "Installed" or "Not Installed" for the keyboard during the Power On Self Test. Normally, it should be set as "Installed".

■ Base Memory and Extended Memory Size

A small section in the upper right corner of the screen displays important status information on your system, including base and extended memory amount. They are updated automatically by the Setup program according to status detected by the BIOS self-test; no manual change is allowed.

5.4 Running the Advanced CMOS Setup

When you choose the "RUN Advanced CMOS Setup" option in the Setup main menu, the screen displays the following menu:

BIOS SETUP PROGRAM - ADVANCED CMOS SETUP (C)1991 American Megatrends Inc., All Rights Reserved	
Above 1 MB Memory Test	: Disabled
Hard Disk Type 47 RAM Area	: Dos 1KB
System Boot Up Num Lock	: On
External Cache Memory	: Enabled
Internal Cache Memory	: Enabled
Password Checking Option	: Setup
Video ROM Shadow C000,32K	: Enabled

ESC:Exit ↓ → ↑ ←: Sel (Ctrl)Pu/Pd:Modify F1:Help F2/F3:Color
F5:Old Values F6:BIOS Setup Defaults F7:Power-On Defaults

Figure 5.4 The Advanced CMOS Setup Program Screen

■ Above 1 MB Memory Test

You can disable this option to bypass the memory test if a lot of memory is installed in the system, or you can enable this option to test all the memory.

■ Hard Disk Type 47 RAM Area

The purpose of this field is to specify the address of the memory area used by the system BIOS for storing extended information, such as to save the user definable drive type 47.

You have the following options:

- 0:300
To reserve the stack area at address 30h:0.
- DOS 1KB
To reserve the top 640 KB in the DOS base memory and reduce the size of base memory by 1 KB.

■ System Boot Up Num Lock

This option can set the "Num Lock" key to "On" or "Off" after system boot up.

■ External/Internal Cache Memory

Due to constraint of technology, speed of currently available DRAM may not be high enough to catch up with the speed of the CPU, which means that at every step of program execution, the CPU must wait for the DRAM to respond.

In fact, for CPU to run faster, the system must be designed to use another kind of fast RAM chip – SRAM (Static-column RAM).

You can have a dual cache architecture – internal (from the CPU) & external cache (from the SRAM).

■ Password Checking Option

The purpose of this field is to determine whether the password is asked for in every boot (set to "Always" or asked for entering into the Setup program (set to "Setup").

■ Video ROM Shadow C000, 32K

This option enables the shadow RAM operation for the video BIOS on display cards such as VGA or EGA. The video card should be checked to be 32 K of ROM. If there is no ROM in the display card, it unnecessary to shadow the Video BIOS.

5.5 Running the Advanced CHIPSet Setup

To program the registers of the CHIPSet, choose the "Advanced CHIPSet Setup" option from the Setup main menu and press <Enter>. The screen will display the following menu:

BIOS SETUP PROGRAM - ADVANCED CHIPSET SETUP (C)1991 American Megatrends Inc., All Rights Reserved	
AUTO Config Function	: Enabled
DRAM Speed	: Slowest
DRAM Write CAS Pulse Width	: 2T
Cache Write Back	: Disabled
Cache Write Cycle	: 3T
Cache Burst Read Cycle	: 1T
BUSCLK Selection	: 7.159MHz
Non-Cacheable Area 1	: DRAM
Non-Cacheable Area 1 Size	: 0 KB
Non-Cacheable Area 1 Start	: Disabled
Non-Cacheable Area 2	: DRAM
Non-Cacheable Area 2 Size	: 0 KB
Non-Cacheable Area 2 Start	: Disabled
C000 Shadow RAM Cacheable	: Disabled
F000 Shadow RAM Cacheable	: Disabled
DRAM Hidden Refresh	: Disabled
I/O Recovery Select	: 11 BCLKs

ESC: Exit Sel (Ctrl) Pu/Pd: Modify F1: Help F2/F3: Color
F5: Old Values F6: BIOS Setup Defaults F7: Power-On Defaults

Figure 5.5 The Advanced CHIPSet Setup

■ AUTO Config Function

If enabled, following parameters will be automatically configured with values depending on CPU Clock speed:

- DRAM Speed
- DRAM Write CAS Pulse Width
- Cache Write Cycle
- Cache Burst Read Cycle
- BUSCLK Selection

If disabled, user selected values for above parameters will be used. The available options are listed below:

- Disabled
- Enabled

■ DRAM Speed

There will be plenty of timing margin if the user adopts Fastest for 25 MHz, Faster for 33 MHz, and Slowest for 50 MHz, even when 100ns DRAMs are used. If 70/80ns DRAMs are used, faster speed option can be selected.

■ DRAM Write CAS Pulse Width

The option determines the number of wait states to be kept when the CPU writes data into the local DRAM.

The available options are as follows:

- 2 T
- 1 T

■ Cache Write Back

If disabled, cache is write-through. If enabled, cache is write-back. A write-back cache can offer higher performance than a write-through if writes to the main memory are much slower than writes to the cache. The write-back cache is also favored when a memory location is written several times in the cache before written into the main memory. The performance advantage of the write-back cache over write-through cache is software dependent.

■ Cache Write Cycle

During CPU cycle, it is used as a write latch function to support longer data hold time for DRAM write, while in hold acknowledge cycle it indicates cache read hit.

■ Cache Burst Read Cycle

Due to constraint for technology, speed of currently available SRAM may not be high enough to catch up with the speed of the CPU, which means that at every step of program execution, the CPU must wait for the SRAM to response. This option determines the number of cycle times to be inserted when CPU read data to SRAM.

Moreover, the setting depends on the speed of the CPU and SRAM. If the CPU is of high speed, the timing of SRAM proceeding data needs an extension except for some SRAM that can be high enough to catch up with the speed of CPU. The available options are as follows:

- 2-1-1-1
- 3-1-1-1
- 3-2-2-2

■ BUSCLK Selection

The BUSCLK Selection is an output clock for the I/O channel. This field used to specify the I/O BUSCLK clock source used by the system. The user does not need to change this settings.

The available options are listed below:

- 7.159MHz
- CPUCLK/2 (is recommended for 16 & 20 MHz)
- CPUCLK/2.5
- CPUCLK/3 (is recommended for 25 MHz)
- CPUCLK/4 (is recommended for 33 MHz)
- CPUCLK/5
- CPUCLK/6 (is recommended for 50 MHz)
- CPUCLK/8

■ Non-Cacheable Area 1/2

In some applications, users desire a block of memory not to be cached. The mainboard provides two programmable non-cacheable regions to serve this function. The memory residing on the AT add-on is non-cacheable. When a memory space is mapped by both the on-board DRAM and AT add-on memory, CPU access will be conducted to the on-board DRAM. If users desire the AT add-on memory to be accessed instead of the on-board DRAM at the overlapped memory space, the two non-cacheable regions can be used to disable the on-board DRAM in the programmed space.

■ Non-Cacheable Area 1/2 Size

For some special I/O cards which need to use system memory, you should reserve some memory space for use. The size of the Non-Cacheable Area 1/2 can be as small as 64KB or as large as 4MB. The Non-Cacheable Area 1/2 Start is set to be "Disabled" as default value.

■ Non-Cacheable Area 1/2 Start

This function is to set the address of Non-Cacheable Area1/2 from starting

■ C000 Shadow RAM Cacheable

If you have a shadowing of the video BIOS at C000 Shadow RAM, you can enable this memory cacheable function.

■ F000 Shadow RAM Cacheable

If you have a shadowing of the system BIOS, you can enable this option for memory cacheable function.

■ DRAM Hidden Refresh

Recently the speed of DRAM is becoming faster so the time needed per refresh cycle is getting shorter. The refresh cycle time for the 100ns DRAM is 200ns minimum, for example. In a system with cache, most of the CPU accesses are referred to the cache so that the DRAM usage (percent of time the DRAM is accessed by the CPU) is significantly reduced.

■ I/O Recovery Select

This field is used to specify the I/O command recovery time except for some add-on card that cannot work properly. It is recommended to set this option at "low" value to enhance the I/O performance.

The available options are as follows:

- 3 BCLKs
- 4 BCLKs
- 5 BCLKs
- 11 BCLKs

5.6 Using the Change Password Setup

To change the password, choose the "CHANGE PASSWORD" option from the Setup main menu and press <Enter>.

1. If the CMOS is bad or this option has never been used, the user is asked to enter new password. The screen will display the following message:

Enter NEW Password:

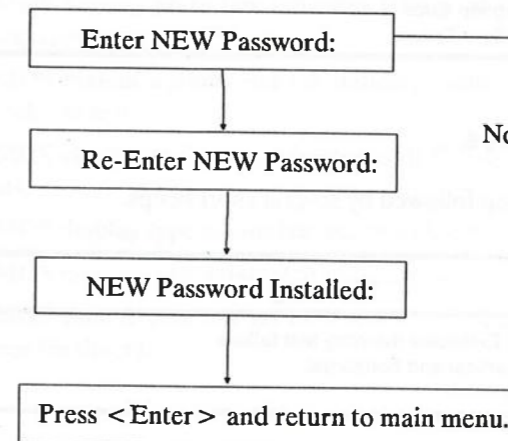
If you want to disabled the password function, you can press <Enter> key to return to the Main Setup menu.

2. If the CMOS is good or this option has been used to enter the password, the user is asked for the password stored in the CMOS. The screen will display the following message:

Enter Current Password:

Enter the correct password and continue to change the password.

After pressing the current password, you can change the password stored in the CMOS. The password can be at most 6 characters long. To change the password, please follow the steps below:



Note: If you want to disabled the password function, you can press <Enter> key in this option. The password prompt will not appear when the system is powered on.

5.7 BIOS Errors and Messages

After entering setup choices, the system will reboot. The setup summary and system information will appear on screen along with messages. These may include **ERROR** messages concerning the system or setup.

AMI BIOS performs various diagnostic tests at the time the system is turned-on. Whenever an error is encountered during these tests, there will be either a few short beeps or an error displayed on the monitor. If the error occurs before the display device is initialized the system reports the error with several short beeps.

If the error is **FATAL**, the system halts after reporting the **FATAL** error. If the error is **NON-FATAL**, the process continues after reporting the error.

5.7.1 Fatal Errors Through Beeps

These errors are conveyed through a number of beeps.

Beep Count	Meaning
1	DRAM refresh failure
2	Base 64 KB RAM failure
4	System timer failure
5	Processor failure
6	Keyboard controller-GATE A20 error
7	Virtual Mode Exception Error
9	ROM-BIOS CheckSum Failure

5.7.2 Non-Fatal Errors Through Beeps

These errors are conveyed as one long beep followed by several short beeps.

Beep Count	Meaning
3	Conventional and Extended memory test failure
8	Display test and vertical and horizontal retrace test failure

5.7.3 Fatal Errors Shown in Display

When these errors are displayed, the screen is cleared, and the error message display is followed by a line saying **SYSTEM HALTED**.

1. **CMOS INOPERATIONAL**: indicates failure of CMOS shutdown register test.
2. **8042 GATE-A20 ERROR**: error in getting into protected mode.
3. **INVALID SWITCH MEMORY FAILURE**
4. **DMA ERROR**: DMA controller page register test failed.
5. **DMA #1 ERROR**: DMA Unit 1 register test failed.
6. **DMA #2 ERROR**: DMA Unit 2 register test failed.

5.7.4 Non-Fatal Errors In Display

There are two types of errors in this category:

1. Ones that require you to press the **F1** key and give you the option of running **SETUP**.
2. Ones that require you to press the **F1** key and don't give you the **SETUP** option.

5.7.5 Errors With Setup Option

1. **CMOS battery state low** indicates failure of CMOS battery or failure in the set and checksum tests.
2. **CMOS system options not set** indicates failure of CMOS battery or failure in set and checksum tests.
3. **CMOS checksum failure** indicates CMOS battery low or a failure in set and checksum tests.
4. **CMOS display type mismatch** indicates failure of display verification.
5. **CMOS memory size mismatch** indicates a System Configuration and setup failure.
6. **CMOS time & date not set** indicates System Configuration verification error and setup error (in timer).

5.7.6 Errors Without Setup Option

1. **CH-2 timer error** indicates channel 2,1,0 timer test failure.
2. **keyboard error** indicates keyboard test failure.
3. **KB/Interface error** indicates keyboard test failure.
4. **Display switch setting not proper** indicates display type verification error.
5. **Keyboard is locked....Unlock it.**
6. **FDD controller error** indicates System Configuration verification error in diskette setup.
7. **HDD controller failure** indicates System Configuration verification error in hard disk setup.
8. **C:Drive error** indicates hard disk setup error.
9. **D:Drive error** indicates hard disk setup error.
10. **D:Drive failure** indicates hard disk failure.

Chapter 6

EISA Configuration Utility

The Extended Industry Standard Architecture (EISA) Configuration Utility is a software utility program that lets you easily configure your EISA computer. The configuration process is completed the first time you set up your computer and any time you add, remove, or move an EISA or ISA board in the computer. These boards, which provide your computer with additional capability, must be physically installed in the computer and added to the configuration information stored in the computer by the EISA Configuration Utility.

EISA systems and adapter cards are much more complex and flexible than the older ISA designs. Using DIP switches and jumpers to configure EISA cards would be much too complex. The EISA configuration Utility was created to automate this configuration process.

Once you complete the configuration process, the configuration information is saved to the computer's nonvolatile memory so it can be used any time you power-on your computer. This chapter provides step-by-step instructions to guide you through the configuration process.

6.1 EISA Specification

EISA is an acronym for Extended Industry Standard Architecture. EISA is basically a superset of the Industry Standard Architecture (ISA), which is based on IBM's original PC/AT specifications. The EISA specifications allow 32-bit memory addressing to be used by the CPU, DMA devices, and bus mastering devices. The above devices can also use either 16-bit or 32-bit data transferring.

6.1.1 EISA/ISA Differences

An important difference between ISA and EISA is that in EISA systems, configuration is done through software, rather than the hardware switches used by an ISA system. In other words, I/O ports, ROM addresses, memory use, and the IRQ and DMA lines for an EISA motherboard and adapter card are configured using an ECU, where an ISA card uses DIP switches and jumpers to perform the same function.

6.1.2 EISA Bus Specification

The EISA computer has 32-bit expansion slots that are fully compatible with 8-bit and 16-bit PC/XT/AT expansion slots. EISA expansion slots have 188 pins. The upper 98 pins are exactly the same as the standard AT pinouts. The lower 90 pins are used for EISA bus signals.

The EISA bus is much faster than the ISA Bus. Not only does EISA provide a wider 32-bit bus, it also provides a maximum 33 MB/sec bus transfer rate. An ISA bus can transfer data at only 8 MB/sec. EISA achieves this higher throughput using high-speed burst mode transfers, which take only one clock cycle. Normal (ISA compatible) transfers take two clock cycles.

EISA Bus Rate Versus the ISA Bus Rate

Attribute	EISA Bus	ISA Bus
Burst Transfer Rate	33 MB/sec	8 MB/sec at 0 wait states
DMA characteristics	Supports 8, 16, and 32-bit DMA	Supports 8 and 16-bit DMA
DMA Transfer Rate	33 MB/sec	1 to 4 MB/sec
Adapter Card Pin Count	188 pins	98 pins
Bus Master	Intelligent Bus Master	No Bus master
Configuring Adapter Cards	Autoconfiguration through ECU. DIP switch and jumper setting still available.	Only DIP Switch and jumper setting available.

6.1.3 EISA Configuration Utility Features

A practical benefit of EISA is automatic configuration of system resources and adapter cards. That means an end to DIP switches, jumpers, and installing configuration files, although switch configurations are still allowed for both ISA and EISA to maintain compatibility.

EISA provides a product identification mechanism for system and adapter cards. The computer automatically interrupts each device during the BIOS Power-On Self Test (POST) for the product identifier, compares it with the ID stored in EISA Extended CMOS RAM and configures the adapter card accordingly.

The EISA configuration scheme has the following characteristics:

- An ECU (EISA Configuration Utility) for configuration of motherboards and adapter cards.
- A software interface to the ECU used by CFG files to control the configuration process.
- CFG files for the ECU.
- CFG files for the motherboard and adapter cards.
- EISA Extended CMOS RAM to store configuration parameters.
- A mechanism to save and restore the configuration parameters.
- BIOS routines to read and write to Extended CMOS RAM.
- Automatic detection and initialization of adapter cards by the BIOS during POST routines.
- 1 KB of I/O address space for each EISA expansion device (adapter card).

6.2 Configuring Your Computer for the First Time

The first time you set up your EISA computer and any time you change the configuration by adding or removing an EISA or ISA board, you must configure your system with the EISA Configuration Utility program. When the configuration process is completed, the configuration is stored in the computer's nonvolatile memory where it is available to the system whenever you use your computer.

The EISA Configuration Utility program is on the System Configuration diskette provided with your computer. Before you use this diskette to run the Configuration Utility program, we recommend that you make a backup copy. This ensures that you will be able to run the program if the original diskette is damaged or lost.

6.3 Installing the ECU

The ECU is easy to install and can be used from either a hard disk drive or a floppy drive.

Hard Disk Drive Operation

Simply copy all files from the ECU floppy disk to the same directory on the hard disk drive. Make sure all CFG files are copied to the same directory.

Floppy Drive

You can execute the ECU from a floppy drive.

Make a backup copy of the AMI ECU floppy disk to use as a working copy.

You may have to run the ECU from a floppy drive if the system hard disk drive must be configured by the ECU before it can be used.

System Requirements

The following are the minimum hardware and software requirements necessary to successfully use the ECU:

- MS-DOS Version 3.2 or later
- 640 KB of RAM Memory
- 1.2 MB Floppy disk Drive and a hard disk drive, monitor and keyboard.

EISA Configuration Files

The ECU floppy disk should contain the following files:

- CFG.EXE the ECU (EISA Configuration Utility)
- EISACFG.HLP ECU Help file
- Several CFG files for ECS products.

Additional file can be created as the ECU is executed.

- the CFG.ISA file is created when any ISA adapter card is configured
- .CMS files are created in the EISA configuration process, as are .INF files.

CFG Files

Each adapter card in the EISA system should come with a CFG file on floppy disk. A card's CFG file contains detailed information on the card as well as the functions that the card can perform. The CFG file tells the ECU the possible configuration choices for the adapter card and the system resources that the adapter card needs. System resources include DMA (Direct Memory Access) channels, IRQ (Interrupt Request) lines, I/O Address Ports, and memory space. Be sure all CFG files for all cards in the system and the CFG file for the motherboard are available before running the ECU.

CMS File

The CMS file contains a copy of the configuration information that is written into the system's Extended CMOS Memory. The default name for a CMS file matches the ID of the system board that was used in the configuration. Each CMS file should have a corresponding INF file.

INF File

The INF file contains detailed information about a configuration such as switch and jumper settings, software statements, connection statements, and resource allocation. The INF file is used by the "Display/Print" command to recall information on a saved configuration. Each INF file should have a corresponding CMS file.

6.4 Running the EISA Configuration Utility

The ECU permits the end user to configure an EISA computer. It is executed every time ISA or EISA adapter cards are physically added, removed, or moved. The ECU operates on the information provided by the CFG (Configuration) files that accompany the EISA motherboard and EISA or ISA adapter cards.

The ECU stores configuration data in battery-backed EISA Extended CMOS RAM. When an EISA system is powered on, the BIOS reads this configuration information and initializes all adapter cards in the system. If the battery runs down, the contents of CMOS RAM can be lost. You must then either reconfigure the system or copy the configuration data to EISA Extended CMOS RAM from a backup source.

6.4.1 Main Menu

The main menu has five choices. To select a choice, use the cursor keys to move the menu bar to the choice, and then press <Enter>. You may also select a choice by pressing the key corresponding to the choice's highlighted letter. If you have a mouse, you may select a choice by moving the mouse cursor to a choice and clicking the left mouse button.

The following sample screen shows the ECU Main Menu.

File	Configure	Display/Print	Help	Quit
F1 = Help ←→ = Move Enter = Select F10 = Colors File handling menu				

The five choices available at the main menu are:

- File** Copy files to and from diskettes or backup configuration files for safe keeping or transport to another system.
- Configure** Configure an EISA system either automatically or manually, check syntax of CFG files, or write configuration information into CMOS memory.
- Display/ Print** Display or print any information related to a configuration that has been saved.
- Help** Context sensitive help.
- Quit** Exit EISA Configuration Utility.

6.4.2 Using Help

The help window may be accessed at any time by pressing the <F1> key or moving the cursor to the Help option at the top of the Main Menu. To remove the Help Menu, press <ESC> key.

The help window includes a menu with five choices. To select a choice, use the tab key or the cursor keys to move the menu bar to the desired choice and then press <Enter>. If you are using a mouse, you may select a menu choice and pressing the left mouse button. The five choices in the help menu are:

- ◀◀ Scrolls the help window back towards the top.
- ▶▶ Scrolls the help window forward.
- Back** Displays the previous help topic.
- Contents** Displays a Table of Contents for the help system.
- Quit** Remove the help window from the screen and continues where you left off.

6.5 File Menu

Use the cursor keys to move the menu bar to the "File" choice and then press . The screen will display the following:

File	Configure	Display/Print	Help	Quit
F1 = Heip ↓, ↑ = Move Enter = Select Esc = Exit Copy CFG file from diskette				

There are three options available from the file menu.

File Copy

This option copies CFG Files from a floppy disk to the current directory. You can override the source and destination to copy files between any two drives/directories. Configuration is easier if all CFG files are in the default directory.

When prompted, insert the floppy disk in the specified drive. Make sure that the drive door is closed.

The ECU displays the names of all CFG files on the floppy disk. Use the cursor keys to move the selection bar over the file(s) to be copied and press <Enter>. Or, if using a mouse, click on the file(s) to be copied and click on <OK>.

The ECU displays the destination drive/directory and prompts to Continue or Change Directory.

You can also use the DOS COPY command to copy the CFG files to the ECU hard disk directory.

Backup Configuration

The Backup option backs up the CMS and INF files to a floppy disk.

If more than one pair of CMS/INF files are in the current directory, screen prompts help choose the files to back up.

Make a backup of the configuration in the event of a battery failure, or to copy a configuration to another EISA system.

To restore an old configuration, choose Write Extended CMOS from the configuration menu. This command copies the information in the CMS file to EISA Extended CMOS RAM which is maintained by a battery when the system is turned off.

About the AMI ECU

This option displays basic information about the EISA Configuration Utility.

6.6 Configuration Options

The ECU is menu-driven for ease of installation. There is also an extensive online help facility which can be accessed at any time by pressing the <F1> key or by moving the cursor to the Help option at the top of the Main Menu screen.

Use the cursor keys to move the menu bar to the "Configure" choice and then press <Enter>. The screen will display the following:

File	Configure	Display/Print	Help	Quit
	Configure Define ISA Board Check CFG File Write Ext. CMOS Board ID Map			
F1 = Help ↓, ↑ = Move Enter = Select Esc = Exit Create a new configuration or modify an old configuration				

The initial configuration screens are described in this section. These screens appear when the system is initially configured or an existing configuration is modified.

The following topics (all ECU configuration options) are discussed in this section:

- Configure
- Define ISA Board
- Check CFG File
- Write Ext. CMOS, and
- Board ID Map

Five options are available from the configure menu:

Configure

Displays the Main configure Menu which is used to control configuration options and to begin a configuration session.

Define ISA Board

Allows you to define an ISA board to be used in a configuration. Use this option only if you have an ISA board with no CFG file.

Check CFG File

Runs a syntax check on one or more CFG files and reports any errors.

Write Ext CMOS

Write Extended CMOS takes saved configuration data from a CMS File and writes the data to the system's Extended CMOS Memory.

Board ID Map

Displays the ID's of boards that are physically present in the system.

6.6.1 Configuration Option

Use the mouse or the cursor keys to highlight the Configure option and press <Enter>. You can also choose by pressing the key corresponding to the choice's highlighted letter. A screen like the following screen is displayed.

Configuration	
Configuration Type <input checked="" type="checkbox"/> Create New Configuration <input type="checkbox"/> Modify Old Configuration	Which CFG files do you want to configure <input type="checkbox"/> Use CFG files for Installed board <input checked="" type="checkbox"/> Use filename listed in CFGLIST file <input type="checkbox"/> Select files one by one <input type="checkbox"/> Use all CFG files in this directory
Configuration Mode <input checked="" type="checkbox"/> Automatic <input checked="" type="checkbox"/> Local <input type="checkbox"/> Manual <input type="checkbox"/> Remote	
<input type="button" value="[OK]"/> <input type="button" value="[Cancel]"/>	

The configure menu has four groups of choices. Within each group only one choice may be selected. Each of the four groups is described below:

■ Configuration Type

Create New Configuration or Modify Old Configuration

Choosing "Create New" will begin a new configuration from scratch. If you want to make changes to a configuration that was saved from an earlier configuration session, choose "Modify Old Configuration."

■ Configuration Mode

Automatic or Manual

In Automatic Mode, the ECU asks only a few essential questions and a default configuration is produced.

In Manual Mode, advanced features such as function choice selection and resource allocation editing is available. Add Board and Remove Board are available only in Manual Mode.

Local or Remote

Select Local Mode if the configuration that you are working on is for this computer. In Local Mode, configuration information is stored in EISA Extended CMOS RAM and a CMS File and INF File.

Select Remote Mode to generate a configuration for a system other than the current system being used. In Remote Mode, the configuration is stored in files only. These files can be copied to a floppy disk via the Backup option. The configuration can be copied to that system's EISA Extended CMOS RAM by using Write Ext. CMOS function.

■ Which CFG Files do you want to configure ?

If Create New Configuration is selected, enter the CFG files (one for each adapter card) to be used for the configuration. There are four options here:

Use CFG files for installed boards

Automatically detects the EISA adapter cards installed and uses the appropriate CFG files for these cards. This option is available in Local Mode only.

Use filenames listed in CFGLIST file

Opens the CFGLIST File which contains a list of CFG files to be used.

Select files one by one

This option allows you to choose CFG files and configure adapter cards interactively.

Use all CFG files in this directory

The ECU configures all CFG files in the current directory.

■ Which CMS File do you want to modify ?

If Modify Old Configuration is selected, select the CMS file that contains the saved configuration data. There are three options here.

Use default CMS file name

The ECU searches for a CMS file matching the name of the motherboard. This option is available in Local Mode only.

Select CMS file from directory list

Select the correct CMS file from a list of all CMS files in the current directory.

Enter CMS file name from keyboard.

Enter the file name of the CMS file to be modified.

6.6.2 Manual Configuration

After you have made a Configuration selection in Manual mode, move the cursor to <OK> and press <Enter>. The following screen appears:

Manual Configuration	
Slot 0 - SL486E EISA System Board	
Slot 1 - Empty	
Slot 2 - Empty	
Slot 3 - Empty	
Slot 4 - Empty	
Slot 5 - Empty	
Slot 6 - Empty	
Slot 7 - Empty	
Slot 8 - Empty	
[Add] [Remove] [Move] [Options] [Save] [Cancel]	

The Manual Configuration Screen allows you to edit the adapter card configuration settings. You can change function choice settings and resource allocation settings by highlighting the adapter card to be modified and pressing <Enter>.

This screen verifies the slot selection and allows you to add, remove, move, display additional options, save, or cancel this configuration.

Add Board

Allows one or more adapter cards to be added to the current configuration. Select the CFG files for each adapter card to be added.

Options

Displays a menu of advanced options.

Remove Board

Remove an adapter card from the current configuration.

Move

Allows you to move the adapter card to another slot.

Save

Select this option when you are done editing, addition, and removing adapter cards. The CMS and INF files are saved. If using Local Mode, EISA Extended CMOS RAM is also updated.

Cancel

This option allows you to cancel changes made in the current session. No changes were saved.

6.6.3 Board Functions Editing

When you choose a configuration setting to edit by moving the cursor to the appropriate adapter card and pressing <Enter>, the following screen appears:

Board Functions		Resources
SL486E EISA System Board		
Basic Main Board Functions		
TIMER	Reserved	Free
Real-time Clock	Reserved	Free
Co-processor	Installed	Link
Keyboard	101 Key	Link
[OK]		

The Adapter card Functions Menu contains a list of all functions for a selected adapter card. Each function has a choice setting and can have one or more resource blocks. To change a function's choice setting, select one of the long horizontal bars on the screen and press <Enter>. To change resource allocation settings, select one of the shorter bars along the right edge of the screen. Select <OK> or press <Esc> when you are finished editing this adapter card.

6.6.4 Function Choice Editing

This Function Choice Selection menu shows the choice settings available for a function. The current setting is indicated by check mark beside that setting. You can change the current setting by selecting a different choice. If a setting causes a conflict with other functions or adapter cards, you cannot select that choice. Select "OK" to change the function's choice setting and return to the previous screen, or select "Cancel" to ignore changes.

Choice Selection
Basic Main Board Functions TIMER Reserves IRQ, DMA and other resources
<input checked="" type="checkbox"/> Reserved
<input type="button" value="[OK]"/> <input type="button" value="[Cancel]"/>

If you selected Automatic Mode, the configuration is saved as soon as you select a slot for last adapter card. The ECU skips to the Display/Print menu as shown below.

Display/ Print
The configuration has been saved. It is important that you do the following steps before using this system:
<ol style="list-style-type: none"> 1. View the switch and jumper settings and verify that all switches and jumpers on the boards in your system are set correctly. Some boards have switches and jumpers that need to be set manually. 2. View the software statements to see if any of the boards in your configuration need special drivers to be loaded.
Do you want to display or print configuration information ?
<input type="button" value="[Yes]"/> <input type="button" value="[No]"/>

This screen gives you the option of printing or displaying system configuration information. The following screens present a sample display.

6.7 Define ISA Board

In addition to EISA adapter cards, you can install ISA adapter cards by choosing the Define ISA Board option.

Most ISA adapter cards do not have a CFG file. Without a CFG file, the ECU cannot reserve system resources automatically for ISA adapter cards. These cards must be configured manually.

The chart below lists the resources used by common ISA adapter cards and helps avoid assigning one of these resources to an EISA adapter card.

Type of ISA Adapter Card	IRQ	DMA	Ports
Floppy Disk Controller:	6	2	3F0h-3F7h
Serial Ports:			
COM1:	4	--	3F8h-3FFh
COM2:	3	--	3F8h-2FFh
COM3:	4	--	3E8h-3EFh
COM4:	3	--	2E8h-2EFh
Parallel Ports:			
LPT1:	7	--	378h-37Fh
LPT2:	5	--	278h-27Fh
Other:			
Other:			

Use the chart as a worksheet and list any other ISA adapter cards.

You can configure the system automatically or manually. If the system has an ISA adapter cards and there is not a CFG file for each adapter card, use Manual Mode to configure a system.

Manual Mode allows you to edit the configuration setting for all adapter cards in the system and make sure there are no resource conflicts between the EISA and ISA adapter cards.

ISA Board Definition

Board Name:
 Manufacturer:
 Board Type: Video Board Slot Type: 16 Bit

DMA	IRQ	Ports	Memory
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

[Save] [Load] [New] [Delete] [Quit]

You can also use the Display/Print option to show all resources used by the EISA adapter cards in the system.

The above screen is displayed when configuring an ISA board. Complete the screen as appropriate and choose Save to save this ISA Board definition. This definition can be used in subsequent configuration sessions.

Choose Save to save this ISA Board definition. This definition can be used in subsequent configuration session.

6.8 Check CFG File

Runs a syntax check on one or more CFG files and reports any errors. The following sample screens depict the screens that can be displayed.

File Selection

Select the CFG files to be checked.
Filespec *.CFG

!ECS1100.CFG - SI486E EISA System Board

!ECS1110.CFG - SL486E EISA System Board

[OK] [Cancel]

Parser Messages

Checking: !ECS1110.CFG
Identified CFG file !ECS1110.CFG
Board : SL486E EISA System Board
Category : SYS
Parsing file : "!ECS1110.CFG"
No errors detected
Number of warnings : 0

[OK]

6.9 Write Ext CMOS

This option copies the contents of a CMS File to EISA Extended CMOS RAM which is maintained by the battery when the system is turned off. Doing this erases any previous configuration information stored in Extended CMOS RAM. If there is more than one CMS File in the current directory, a prompt asks which one to use. The following sample screen shows the extended CMOS screen.

Write Extended CMOS

This command writes data to extended CMOS from a CMS file. This will destroy any previous configuration information that is stored in the system's CMOS memory.

[OK] [Cancel]

6.10 Board ID Map

This option displays a map of all EISA adapter cards in the system.

Physical Board ID Map

The following boards are physically present in this system. ISA boards may not be shown.

Slot	ID	Slot	ID
0	ECS1110	8	Empty
1	Empty	9	Empty
2	Empty	10	Empty
3	Empty	11	Empty
4	Empty	12	Empty
5	Empty	13	Empty
6	Empty	14	Empty
7	Empty	15	Empty

[OK]

6.11 Other Main Menu Options

Display/ Print Menu

The Display/Print option presents a screen display of configured adapter cards. The following screen appears. You can select any number of the listed options to display.

Display/ Print																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Information</th> </tr> </thead> <tbody> <tr><td><input type="checkbox"/> Board Information</td></tr> <tr><td><input type="checkbox"/> Switches & Jumpers</td></tr> <tr><td><input type="checkbox"/> Software Statements</td></tr> <tr><td><input type="checkbox"/> Connection Statements</td></tr> <tr><td><input type="checkbox"/> DMA Resources</td></tr> <tr><td><input type="checkbox"/> IRQ Resources</td></tr> <tr><td><input type="checkbox"/> Port Resources</td></tr> <tr><td><input type="checkbox"/> Memory Resources</td></tr> </tbody> </table>	Information	<input type="checkbox"/> Board Information	<input type="checkbox"/> Switches & Jumpers	<input type="checkbox"/> Software Statements	<input type="checkbox"/> Connection Statements	<input type="checkbox"/> DMA Resources	<input type="checkbox"/> IRQ Resources	<input type="checkbox"/> Port Resources	<input type="checkbox"/> Memory Resources	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Source</th> </tr> </thead> <tbody> <tr><td><input type="checkbox"/> All Boards</td></tr> <tr><td><input type="checkbox"/> Selected Boards</td></tr> </tbody> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">To</th> </tr> </thead> <tbody> <tr><td><input type="checkbox"/> Screen</td></tr> <tr><td><input type="checkbox"/> Printer</td></tr> <tr><td><input type="checkbox"/> File</td></tr> </tbody> </table>	Source	<input type="checkbox"/> All Boards	<input type="checkbox"/> Selected Boards	To	<input type="checkbox"/> Screen	<input type="checkbox"/> Printer	<input type="checkbox"/> File
Information																	
<input type="checkbox"/> Board Information																	
<input type="checkbox"/> Switches & Jumpers																	
<input type="checkbox"/> Software Statements																	
<input type="checkbox"/> Connection Statements																	
<input type="checkbox"/> DMA Resources																	
<input type="checkbox"/> IRQ Resources																	
<input type="checkbox"/> Port Resources																	
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Source																	
<input type="checkbox"/> All Boards																	
<input type="checkbox"/> Selected Boards																	
To																	
<input type="checkbox"/> Screen																	
<input type="checkbox"/> Printer																	
<input type="checkbox"/> File																	
<input type="button" value="[OK]"/> <input type="button" value="[Cancel]"/>																	

The Display/Print menu has three group of options.

1. The information to be displayed or printed. You can choose one or more option.
2. The information source All Board or Selected Board. If you choose Selected Board, a list of adapter cards is displayed.
3. The screen, printer (LPT1), or file. If you choose "File," the ECU asks for a DOS filename.
4. OK to display the information. Choose Cancel to return to the Main Menu.

Using Help

Help can be accessed at any time by pressing <F1> or moving the cursor to the Help option at the top of the Main Menu.

Quit

The last Main Menu option exits from the ECU and returns to DOS.

Appendix A

Hard Disk Types

Type	Cylinders	Heads	Write-Precomp	Landing Zone	Sectors	Capacity (Mbytes)
1	306	4	128	305	17	10
2	615	4	300	615	17	20
3	615	6	300	615	17	31
4	940	8	512	940	17	62
5	940	6	512	940	17	47
6	615	4	65535	615	17	20
7	462	8	256	511	17	31
8	733	5	65535	733	17	30
9	900	15	65535	901	17	112
10	820	3	65535	820	17	20
11	855	5	65535	855	17	35
12	855	7	65535	855	17	50
13	306	8	128	319	17	20
14	733	7	65535	733	17	43
15	000	0	000	000	17	00
16	612	4	0000	663	17	20
17	977	5	300	977	17	41
18	977	7	65535	977	17	57
19	1024	7	512	1023	17	60
20	733	5	300	732	17	30

Table A.1 AMI BIOS Hard Disk Types

Table A.1 AMI BIOS Hard Disk Types Continued

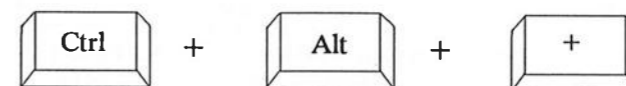
21	733	7	300	732	17	43
22	733	5	300	733	17	30
23	306	4	0000	336	17	10
24	325	7	0000	925	17	54
25	925	9	65535	925	17	69
26	754	7	754	754	17	44
27	754	11	65535	754	17	69
28	699	7	256	699	17	41
29	823	10	65535	823	17	68
30	918	7	918	918	17	53
31	1024	11	65535	1024	17	94
32	1024	15	65535	1024	17	128
33	1024	5	1024	1024	17	43
34	612	2	128	612	17	10
35	1024	9	65535	1024	17	77
36	1024	8	512	1024	17	68
37	615	8	128	615	17	41
38	987	3	987	987	17	25
39	987	7	987	987	17	57
40	820	6	820	820	17	41
41	977	5	977	977	17	41
42	981	5	981	981	17	41
43	830	7	512	830	17	48
44	830	10	65535	830	17	69
45	917	15	65535	918	17	114
46	1224	15	65535	1223	17	152

Appendix B

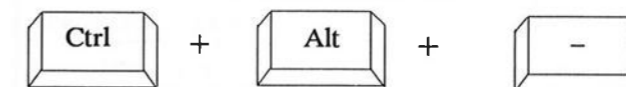
Setting the System Speed

The SL 486E offers two methods to select the system processing speed. You can change the speed during operation while you are working with your application program.

High Speed



Low Speed



* "+" means one must press the keys simultaneously.

COMPATIBILITY CLAIM FORM

SALES: _____
 REQUEST DATE: ___/___/___
 TARGET DATE: ___/___/___
 REVISED DATE: ___/___/___

CUSTOMER INFORMATION:

COMPANY NAME:	TEL NO.:
CONTACT PERSON:	FAX NO.:
ADDRESS	

REQUEST INFORMATION:

PRODUCT	MODEL: S/N: SHIPPING DATE: ___/___/___	DATE CODE: BIOS REV.: PCB REV.:
PERIPHERAL /SYSTEM CONFIGUR- ATION	ON-BOARD MEMORY: ___MB RAM-CARD TYPE: __, __MB FDC/HDC: __, __ FDD/A: ___MB B: ___MB VIDEO CARD: _____	CPU CLOCK SPEED: ___MHz HD: _____TYPE: _____ K/B CONTROLLER TYPE: _____ CO-PRO. (Y/N): ___SPD: ___MHz APP. S/W: _____ VER.: _____
APPLICATION S/W SETUP CONDITION:		

PROBLEM STATUS:

PROBLEM OCCURS	PROBLEM OCCURRED DURING
___ ONLY ONCE	___ INSTALLATION
___ INTERMITTENTLY	___ OPERATION
___ CONTINUOUSLY	___ OTHER

PROBLEM DESCRIPTION/ERROR MESSAGE:

SOLUTION/RESPONSE